

REMARKS

This Response is submitted in reply to the final Office Action mailed on July 8, 2009. A request for continued examination ("RCE") is submitted with this Response. The Director is authorized to charge \$405.00 for the RCE and any additional fees that may be required, or to credit any overpayment to Deposit Account No. 02-1818. If such a withdrawal is made, please indicate the Attorney Docket No. 112843-89 on the account statement.

Claims 12-17 and 20-39 are pending in this application. Claims 1-11 were previously canceled. Claims 18-19 and 40-41 were previously withdrawn. In the Office Action, Claims 12-17 and 20-39 are rejected under 35 U.S.C. § 102; and Claims 12-17 and 20-39 are rejected under 35 U.S.C. § 103. In response, Claims 12-13 and 19-23 have been amended. The amendments do not add new matter. In view of the amendments and/or for the reasons set forth below, Applicants respectfully submit that the rejections should be withdrawn and the application now passed to allowance.

In the Office Action, Claims 12-17, 20-24 and 28-39 are rejected under 35 U.S.C. §102(b) as anticipated by, or in the alternative, under 35 U.S.C. §103(a) as being unpatentable over U.S. Patent No. 4,835,198 to Kohno et al. ("Kohno"). Claims 12-17 and 20-39 are rejected under 35 U.S.C. §102(b) as anticipated by, or in the alternative, under 35 U.S.C. §103(a) as being unpatentable over JP 61261341 to Konno et al. ("Konno") or JP 64002647 to Kano et al. ("Kano"). Applicants respectfully traverse these rejections for at least the reasons set forth below.

Independent Claim 12 has been amended for clarification purposes. Independent Claim 12 recites, in part, a polyvinyl alcohol gel comprising at least two different polyvinyl alcohols ("PVAs"). Each polyvinyl alcohol is a type selected from the group consisting of PVA1, PVA2 and PVA3. In contrast, the cited references fail to disclose each and every element of independent Claim 12.

In an embodiment, a PVA2 having a moderate and especially low degree of polymerisation ("DP") in the range of about 1000-50 is used in combination with PVA1 to form a polyvinyl alcohol gel ("PVAG"). By mixing PVA1 and PVA2, the viscosity of the solution is reduced and higher concentrations ("C_p") can be processed by means of solution methods. It would initially be expected that the mechanical properties of the resulting PVAG are reduced by

the fraction of PVA2 and the advantage of the higher solution concentration is thus at least partly cancelled out thereby. However, an opposite effect was surprisingly found. If a fraction of PVA1 is replaced by PVA2 at the same Cp, PVAGs having a higher moduli of elasticity are obtained whereby the assumed disadvantage appears as an advantage and is added to the advantage of the higher solution concentration Cp. This effect of PVA2 can be explained by the fact that short-chain PVA can crystallise very well, e.g., quickly and completely whereby the crystalline fraction of the PVAG is increased. Heterocrystallisation of PVA1 and PVA2 also takes place, i.e., the crystallites forming the linking points of the network constituting the gel have both PVA1 and PVA2 macromolecules wherein the shorter-chain PVA2 macromolecules induce the crystallisation of segments of PVA1 macromolecules to heterocrystallites. Thus, overall higher network densities are achieved, e.g., via finer-meshed networks and higher moduli of elasticity of the resulting PVAG.

In another embodiment, the mechanical properties of PVAG can be further improved by using PVA3 that comprises long-chain branchings where the DP of these long chains is >50, especially if PVA3 is used in combination with PVA2 and/or PVA1. Because the various side chains are incorporated in various crystallites by heterocrystallisation, additional network linking points are formed, wherein these linking points are of a covalent nature.

Kohno fails to disclose or suggest a polyvinyl alcohol gel comprising at least two different PVAs as required by independent Claim 12. Instead, *Kohno* is directed to a polymer composition that comprises (A) a starch, (B) a vinyl alcohol polymer having an alkyl group of 4 to 50 carbon atoms at the terminal, and/or (C) a polyvinyl alcohol. The second component (B) of *Kohno* is not a polyvinyl alcohol in accordance with the present claims. Instead it is a terminally modified vinyl alcohol polymer. See *Kohno*, column 20, lines 19 - 54. According to paragraph [0002] of Applicants' specification, a polyvinyl alcohol is the product of hydrolysis of polyvinyl acetate. Accordingly, the terminally modified vinyl alcohol polymer taught by *Kohno* is distinguishable from the polyvinyl alcohol according to the present claims.

Similarly, *Konno* and *Kano* fail to disclose or suggest a polyvinyl alcohol gel comprising at least two different PVAs as required by independent Claim 12. *Konno* and *Kano* also fail to disclose or suggest that the degrees of polymerisation ("DP") of PVA1 and PVA3 are >1000 and the degree of polymerisation ("DP") of PVA2 is in the range of 50-1000 as required by Claim

12. In addition, *Konno* and *Kano* fail to disclose or suggest that the PVA1 and PVA2 are predominantly linear whereas PVA3 has a fraction of long-chain branchings as required by Claim 12. In fact, the Patent Office has failed to even show where in *Konno* and *Kano* the recited elements are.

Konno is directed to a water-containing composition comprising a metal salt of polyacrylic acid (A), vinyl alcohol/acrylic acid copolymer (B), water (C) and polyalcohol (D). Although the vinyl alcohol/acrylic acid copolymer (B) may be regarded as a PVA, *Konno* fails to teach or even suggest a second PVA that is different from the first PVA in the water-containing composition. Moreover, the polyalcohol (D) is not a PVA. Polyalcohols (i.e., polyols) are monomeric compounds comprising several hydroxyl groups (e.g., glycerin or sugars). Regardless of their name, these compounds are not polymers. In contrast, PVA is an actual polymer built from $\text{CH}(\text{OH})\text{-CH}_2$ repeating units.

Kano is directed to a composition having as a component a mixture of a high hydrolysis ratio polyvinyl alcohol and a low hydrolysis ratio polyvinyl alcohol having a hydrolysis ratio of 20 - 30 %. Although the term "polyvinyl alcohol" is used by *Kano* to refer to the compound with low hydrolysis ratio, the skilled person would not consider such type of composition to be a true PVA. Instead, a low hydrolysis ratio polyvinyl alcohol having a hydrolysis ratio of 20-30% is a polyvinyl acetate that has been partially hydrolyzed. In contrast, dependent Claims 20-23 recite that PVAs with a degree of hydrolysis in mole % of > 95 (Claim 20), > 98 (Claim 21), > 99 (Claim 22) and > 99.8 (Claim 23). As a result, the PVAs in embodiments of the present claims have a clearly higher degree of hydrolysis than that disclosed by *Kano*.

In sum, the cited references fail to disclose or suggest each and every element of independent Claim 12. Moreover, the cited references fail to even recognize the advantages, unexpected benefits and/or properties of a polyvinyl alcohol gel comprising at least two different PVAs in accordance with the present claims. For at least the reasons discussed above, Applicants respectfully submit that independent Claim 12, along with the claims that depend from Claim 12, are novel, nonobvious and distinguishable from the cited references.

Accordingly, Applicants respectfully request that the rejections of the pending claims be withdrawn.

For the foregoing reasons, Applicants respectfully request reconsideration of the above-identified patent application and earnestly solicit an early allowance of same. In the event there remains any impediment to allowance of the claims which could be clarified in a telephonic interview, the Examiner is respectfully requested to initiate such an interview with the undersigned.

Respectfully submitted,

K&L GATES LLP

BY 

Robert M. Barrett
Reg. No. 30,142
Customer No. 24573
Phone No. 312-807-4204

Dated: September 28, 2009